

February 12, 2002

MEMORANDUM TO: Ashok C. Thadani, Director
Office of Nuclear Regulatory Research

FROM: Farouk Eltawila, Director */RA/*
Division of Safety Analysis and Regulatory Effectiveness
Office of Nuclear Regulatory Research

SUBJECT: MEETING WITH EXELON GENERATION COMPANY, DEPARTMENT
OF ENERGY, AND OTHER INTERESTED STAKEHOLDERS
REGARDING THE PEBBLE BED MODULAR REACTOR
(PROJECT 713)

On November 29-30, 2001, the Nuclear Regulatory Commission (NRC) staff held the 7th meeting with representatives of Exelon Generation Company (Exelon). Other stakeholders, including the Department of Energy (DOE), were provided an opportunity to comment. The meeting addressed pre-selected topics associated with the Pebble Bed Modular Reactor (PBMR) pre-application review. Attachment 1 contains the agenda for the meeting. Attachment 2 contains a list of the attendees.

In his opening remarks, RES Project Manager, Stuart Rubin (NRC), discussed the principle objectives of the PBMR pre-application review, which is to prepare feedback and guidance to Exelon on the significant issues related to the siting, construction, and licensing of a PBMR in the United States. Exelon's comments and questions and the Future Licensing and Inspection Readiness Assessment (FLIRA) Report prepared by the staff were discussed. A PBMR Pty. representative provided a comprehensive tutorial presentation on the PBMR operational modes and operation states of the PBMR. This was followed by an Exelon presentation on their views of the kinds of testing that would be needed for a PBMR combined construction permit and operating license (COL).

Nanette Gilles of the New Reactor Licensing Project Office (NRLPO), NRR, provided a brief overview of the future licensing and inspection readiness assessment that was included as an attachment to SECY-01-0188, dated October 12, 2001. Ms. Gilles' presentation reviewed information regarding the purpose of the assessment and the process and assumptions that were used to perform the assessment. The slide presentation is provided in Attachment 3. Following the presentation, Exelon was provided an opportunity to comment and discuss questions previously provided to the staff in their letter dated, November 26, 2001 (Attachment 4). Kevin Borton of Exelon lead the discussion. Some of the key issues discussed were the impact of planned rulemaking on potential future applications, the scope of the Part 52 Rulemaking with respect to the NEI petitions, and the assumptions that were used by the staff in developing resource estimates and schedules.

William Kriel, PBMR Pty. provided a tutorial presentation on "PBMR Operational Modes and States." The presentation provided an overview of the operational states and application of

PBMR Pty. analytical methods used to analyze the PBMR operations such as changes in modes and states and anticipated operational occurrences. Attachment 5 contains a copy of the slides used during the presentation. Additionally, on November 27, 2001, in support of the presentation, Exelon provided the staff with an advance copy of a technical "white paper" entitled "PBMR Operational Modes and States." The white paper (Attachment 6) formally documented the technical information covered in the oral presentation. Exelon did not request a NRC formal review of this presentation.

The final presentation was given on "Testing Requirements for a Combined License" by Kevin Borton (Exelon) and Rod Krich (Exelon). Attachment 7 contains a copy of the slides presented during this presentation. In regards to testing requirements (see summary tables in Attachment 7), the applicant (Exelon) stated that there were no testing prerequisites for the issuance of a combined license. Exelon believes that full-scale prototype testing is not required for a combined license, and to require prototype testing for issuance of a combined license would create a "Catch-22." Exelon intends to use previous PBMR test data and believes that demonstration testing in South Africa was not needed to support licensing of the PBMR in the United States. Exelon also requested future discussions on the process and need for testing to license the PBMR in the United States.

Jerry Wilson (NRLPO) stated that there are three types of testing, that relate to the licensing of nuclear power plants (NPPs) in the in the United States: (1) "Confirmatory" testing, which is not required to license NPPs and, is performed to confirm the understanding of a phenomena or the performance of a safety feature; (2) "Verification" testing, which is required under section XI of Appendix B to Part 50 and 10 CFR 52.97(b), and is performed during and after construction of the NPP to verify that the as-built plant conforms with the approved design, and (3) "Qualification" testing, which is required under section III of Appendix B to Part 50 and 10 CFR 52.47(b)(2), and is performed to demonstrate that safety features will perform as predicted in the safety analysis report and to qualify analytical codes for use in the plant's safety analysis.

Mr. Wilson stated that if it is determined that qualification testing is necessary for a NPP design, NRR will require that testing be completed before a license is issued. In addition, license conditions could not be used in lieu of performing qualification tests before licensing. Mr. Wilson stated that different type(s) of testing may be necessary to qualify a NPP, depending on the design, and would be determined on a case-by-case basis. Furthermore, while full-scale prototype testing is not a necessary requirement for licensing NPPs, it could be required for certain designs. Mr. Wilson disagreed with Exelon's claim that there is a "Catch-22" in the process for licensing a prototype NPP. It was agreed that NRC and Exelon should have future discussions on the process for determining whether and what testing will be necessary to license a PBMR in the United States.

Attachments: As stated **ADAMS Package Accession Number ML020450095**

cc w/o atts: See attached list

A. Thadani

3

Memorandum dated: February 12, 2002

SUBJECT: MEETING WITH EXELON GENERATION COMPANY, DEPARTMENT
OF ENERGY, AND OTHER INTERESTED STAKEHOLDERS
REGARDING THE PEBBLE BED MODULAR REACTOR
(PROJECT 713)

cc w/o atts:

Ralph Beedle
Senior Vice President and Chief Nuclear Officer
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Marilyn Kray
Vice President Special Projects
Exelon Generation
200 Exelon Way
Kenneth Square, PA 19348

Edward F. Sproat, III
Vice President-International Projects
Exelon Generation
200 Exelon Way
Kenneth Square, PA 19348

Kevin Borton
Exelon Generation
200 Exelon Way
Kenneth Square, PA 19348

David Lochbaum
Union of Concerned Scientists
1707 H Street, NW
Washington, DC 20006-3919

Dr. Gail Marcus
U.S. Department of Energy
Office of Nuclear Energy, Science and Technology
NE-1, Room 5A-143
1000 Independence Avenue, SW
Washington, DC 20585

A. Thadani

4

Memorandum dated: February 12, 2002

SUBJECT: MEETING WITH EXELON GENERATION COMPANY, DEPARTMENT
OF ENERGY, AND OTHER INTERESTED STAKEHOLDERS
REGARDING THE PEBBLE BED MODULAR REACTOR

cc w/o atts (continued):

William D. Magwood, IV
U.S. Department of Energy
Office of Nuclear Energy, Science and Technology
NE-1, Room 5A-143
1000 Independence Avenue, SW
Washington, DC 20585

Mr. Paul Gunter
Nuclear Information & Resource Service
1424 16th Street, NW, Suite 404
Washington, DC 20036

Mr. James Riccio
Public Citizen's Critical Mass Energy Project
211 Pennsylvania Avenue, SE
Washington, DC 20003

Mr. Ron Simard
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Stephen Antonelli
Research Associate on Nuclear Energy
Public Citizen's Critical Mass Energy & Environment Program
215 Pennsylvania Avenue, SE
Washington, DC 20003

modes and states and anticipated operational occurrences. Attachment 5 contains a copy of the slides used during the presentation. Additionally, on November 27, 2001, in support of the presentation, Exelon provided the staff with an advance copy of a technical "white paper" entitled "PBMR Operational Modes and States." The white paper (Attachment 6) formally documented the technical information covered in the oral presentation. Exelon did not request a NRC formal review of this presentation.

The final presentation was given on "Testing Requirements for a Combined License" by Kevin Borton (Exelon) and Rod Krich (Exelon). Attachment 7 contains a copy of the slides presented during this presentation. In regards to testing requirements (see summary tables in Attachment 7), the applicant (Exelon) stated that there were no testing prerequisites for the issuance of a combined license. Exelon believes that full-scale prototype testing is not required for a combined license, and to require prototype testing for issuance of a combined license would create a "Catch-22." Exelon intends to use previous PBMR test data and believes that demonstration testing in South Africa was not needed to support licensing of the PBMR in the United States. Exelon also requested future discussions on the process and need for testing to license the PBMR in the United States.

Jerry Wilson (NRLPO) stated that there are three types of testing, that relate to the licensing of nuclear power plants (NPPs) in the in the United States: (1) "Confirmatory" testing, which is not required to license NPPs and, is performed to confirm the understanding of a phenomena or the performance of a safety feature; (2) "Verification" testing, which is required under section XI of Appendix B to Part 50 and 10 CFR 52.97(b), and is performed during and after construction of the NPP to verify that the as-built plant conforms with the approved design, and (3) "Qualification" testing, which is required under section III of Appendix B to Part 50 and 10 CFR 52.47(b)(2), and is performed to demonstrate that safety features will perform as predicted in the safety analysis report and to qualify analytical codes for use in the plant's safety analysis.

Mr. Wilson stated that if it is determined that qualification testing is necessary for a NPP design, NRR will require that testing be completed before a license is issued. In addition, license conditions could not be used in lieu of performing qualification tests before licensing. Mr. Wilson stated that different type(s) of testing may be necessary to qualify a NPP, depending on the design, and would be determined on a case-by-case basis. Furthermore, while full-scale prototype testing is not a necessary requirement for licensing NPPs, it could be required for certain designs. Mr. Wilson disagreed with Exelon's claim that there is a "Catch-22" in the process for licensing a prototype NPP. It was agreed that NRC and Exelon should have future discussions on the process for determining whether and what testing will be necessary to license a PBMR in the United States.

Attachments: As stated

ADAMS Package Accession Number ML020450095

cc w/o atts: See attached list

Distribution w/o atts.:

DSARE R/F	RTripathi, RES	WBorchardt, NRR
REAHFB R/F	PKadambi, RES	ACRS
RZimmerman, RES	ACubbage, NRR	JDunn-Lee, IP
MMayfield, RES	NGilles, NRR	JMoore, OGC
CAder, RES	JWilson, NRR	MVirgilio, NMSS
DCarlson, RES	JLyons, NRR	MWeber, NMSS

C:\Program Files\Adobe\Acrobat 4.0\PDF Output\MeetingSummary1_9_023.wpd

*See previous concurrence

OAD in ADAMS? (Y or N) Y ADAMS ACCESSION NO.: ML020440279 TEMPLATE NO. RES-006

Publicly Available? (Y or N) Y DATE OF RELEASE TO PUBLIC 5 days SENSITIVE? NO

To receive a copy of this document, indicate in the box: "C" = Copy without enclosures "E" = Copy with enclosures "N" = No copy

OFFICE	REAHFB		C:REAHFB		D:DSARE	
NAME	SRubin:ecm		JFlack by JIbarra		FEltawila	
DATE	02/06/02*		02/11/02*		02/12/02*	

Memorandum dated: February 12, 2002

SUBJECT: MEETING WITH EXELON GENERATION COMPANY, DEPARTMENT
OF ENERGY, AND OTHER INTERESTED STAKEHOLDERS
REGARDING THE PEBBLE BED MODULAR REACTOR
(PROJECT 713)

cc w/o atts:

Ralph Beedle
Senior Vice President and Chief Nuclear Officer
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Marilyn Kray
Vice President Special Projects
Exelon Generation
200 Exelon Way
Kenneth Square, PA 19348

Edward F. Sproat, III
Vice President-International Projects
Exelon Generation
200 Exelon Way
Kenneth Square, PA 19348

Kevin Borton
Exelon Generation
200 Exelon Way
Kenneth Square, PA 19348

David Lochbaum
Union of Concerned Scientists
1707 H Street, NW
Washington, DC 20006-3919

Dr. Gail Marcus
U.S. Department of Energy
Office of Nuclear Energy, Science and Technology
NE-1, Room 5A-143
1000 Independence Avenue, SW
Washington, DC 20585

Memorandum dated: February 12, 2002

SUBJECT: MEETING WITH EXELON GENERATION COMPANY, DEPARTMENT
OF ENERGY, AND OTHER INTERESTED STAKEHOLDERS
REGARDING THE PEBBLE BED MODULAR REACTOR

cc w/o atts (continued):

William D. Magwood, IV
U.S. Department of Energy
Office of Nuclear Energy, Science and Technology
NE-1, Room 5A-143
1000 Independence Avenue, SW
Washington, DC 20585

Mr. Paul Gunter
Nuclear Information & Resource Service
1424 16th Street, NW, Suite 404
Washington, DC 20036

Mr. James Riccio
Public Citizen's Critical Mass Energy Project
211 Pennsylvania Avenue, SE
Washington, DC 20003

Mr. Ron Simard
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Stephen Antonelli
Research Associate on Nuclear Energy
Public Citizen's Critical Mass Energy & Environment Program
215 Pennsylvania Avenue, SE
Washington, DC 20003

AGENDA

NRC Meeting with Exelon and DOE on the PBMR Pre-application Review
(ASLBP Hearing Room T3B45)

Thursday, November 29, 2001
(1:00 pm - 3:15 pm)

1:00-1:10 PM	Introductory Remarks (A. Cubbage)	NRC
1:10-1:25 PM	Future Licensing and Inspection Readiness Assessment Report (N.Gillles)	NRC
1:25-3:00 PM	Discussion of Exelon Comments and Questions on the FLIRA Report (K. Borton)	Exelon/NRC
3:00-3:10 PM	Stakeholder Comments	
3:10-3:15 PM	Closing Remarks	NRC/Exelon

Friday, November 30, 2001
(9:00 am - 1:00 pm)

9:00-9:15 AM	Introductory Remarks (S. Rubin)	NRC
9:15-10:30 AM	PBMR Operation, Modes and States (Willem Kriel)	PBMR
10:30-10:45 AM	Break	
10:45-11:45 AM	PBMR Operation, Modes and States - Continued (Willem Kriel)	PBMR
11:45-12:45 PM	Exelon Views on Testing Requirements for a PBMR COL (Rod Krich, Kevin Borton)	Exelon
12:45-12:55 PM	Stakeholder Comments	
12:55-1:00 PM	Closing Remarks	NRC/Exelon

**NRC/EXELON PBMR PRE-APPLICATION MEETING
NOVEMBER 29, 2001**

NAME	AFFILIATION	PHONE	E-MAIL
Amy Cabbage	NRC/NRR/NRLPO	415-2875	AEC@NRC.GOV
Nanette Gilles	NRC/NRR/NRLPO	415-1180	nvg@nrc.gov
Joe Williams	NRC/NRR/NRLPO	415-1470	JFW1@NRC.GOV
Thomas Kenyon	NRC/NRR/NRLPO	415-1120	YJK2@NRC.GOV
William Kriel	PBMR/Exelon	+2782 5771229	William.Kriel@pbmr.co.za
Kevin Borton	Exelon Gen	610-765-5528	Kevin.Borton@exeloncorp.com
RM Krich	Exelon Nuclear	630-657-2813	rod.krich@exeloncorp.com
Steve Frantz	Morgan, Lewis @ Bockius LLP	202-467-7460	s.frantz@morganlewis.com
Deann Raleigh	LIS, Scientech	301-258-2551	draleigh@scientech.com
Roger Huston	Licensign Support Services	703-671-9738	Roger@licensingssupport.com
Ray Reith	INEEL/DOE NE	301-903-2663	Raymond.Reith@HQ.DOE.GOV
Tom Miller	DOE-NE	301-903-4517	Tom.Miller@hq.DOE.GOV
Charles Brinkman	Westinghouse Electric Co.	301-881-7040	brinkmcb@westinghouse.com
Russ Bell	NEI	202-739-8087	rjb@nei.org
Jerry N. Wilson	NRC/NRLPO		JNW@NRC.GOV
N. Prasad Kadambi	NRC/RES	301-415-5896	npk@nrc.gov
Lane Hay	SERCH Bechtel	301-228-6312	hlhay@bechtel.com
Bill Gleaves	NRC/NMSS	301-415-5848	bcg@nrc.gov

**NRC/EXELON PBMR PRE-APPLICATION MEETING
NOVEMBER 29, 2001**

Jim Riccio	Greenpeace	202-319-2487	jim.riccio@wdc.greenpeace.org
Edwin Lyman	Nuc. Control Inst.	202-822-6594	lyman@nci.org
Raji Tripathi	NRC/RES	301-415-7472	rrt1@nrc.gov
Jose Ibarra	NRC/RES	301-415-6345	jgi@nrc.gov
Simon Barber	Business Day	202-276-5084	Sibarbe@attglobal.net
Steven Arndt	NRC/RES	301-415-6502	saa@nrc.gov
Charles Ader	NRC/RES	301-415-0135	cea@nrc.gov
Julia McAnallen	NRC/NMSS	301-415-7849	jsm@nrc.gov
Joe Sebrosky	NRC/NRLPO	301-415-1180	

**ATTENDANCE LIST NRC/EXELON MEETING
NOVEMBER 30, 2001**

NAME	AFFILIATION	TELEPHONE	E-MAIL ADDRESS
Stuart Rubin	NRC/RES	301-415-7480	SDR1@NRC.GOV
Amy Cabbage	NRC/NRR/NRLPO	301-415-2875	AEC@NRC.GOV
Tom King	NRC/RES	301-415-7499	TLK@NRC.GOV
John Flack	NRC/RES	301-415-5739	JHF@NRC.GOV
Don Carlson	NRC/RES	301-415-0109	DEC1@nrc.gov
William Kriel	Exelon/PBMR	+27825771229	William.Kriel@PBMR.co.za
Kevin Borton	Exelon Gen	610-765-5528	kevin.borton@exeloncorp.com
Jim Lyons	NRC/NRR/NRLPO	301-415-1126	jel@nrc.gov
N.P. Kadambi	NRC/RES	301-415-5896	npk@nrc.gov
Tom Miller	DOE-NE	301-903-4517	Tom.Miller@hq.doe.gov
Roger Huston	Licensing Support Services	703-671-9738	Roger@licensingssupport.com
Ray Reith	INEEL/DOE-NE	301-903-2663	Raymond.Reith@hq.doe.gov
Charles Brinkman	Westinghouse Electric Co.	301-881-7040	brinkmcb@westinghouse.com
Steve Frantz	Morgan, Lewis & Bockius UP	202-467-7460	sfrantz@morganlewis.com
Alan Rubin	NRC/RES	301-415-6776	AMR@NRC.GOV
Erasmia Lois	NRC/RES	301-415-6560	EXL1@nrc.gov
Undine Shoop	NRC/NRR/DSSA	301-415-2063	uss@nrc.gov
Raji Tripathi	NRC/RES	301-415-7472	rt1@nrc.gov
Jose Ibarra	NRC/RES	301-415-6345	jgi@nrc.gov
Thomas Kenyon	NRC/NRR/NRLPO	301-415-1120	TJK2@NRC.GOV
James Bongarra	NRC/NRR/DIPM	301-415-1046	JXB@NRC.GOV
Steve LaVie	NRC/NRR/DSSA	301-415-1081	sfl@nrc.gov
Les Hulton	Serco Assurance U.K.	+44 1305 202792	les.hulton@sercoassurance.com
Dave Powney	Serco Assurance U.K.	+44 1305 202113	dave.powney@sercoassurance.com
Yuri Orechwa	NRC/NRR	301-415-1057	yx0@nrc.gov
Mark Kowal	NRC/NRR	301-415-1663	mxx7@nrc.gov
Robert Taylor	NRR/DSSA/SRYB	(301)415-1869	RXT2@nrc.gov
Frank Akstulewicz	NRR/DSSA/SRYB	301-415-1136	FMA@NRC.GOV
Steven Arndt	RES	301-415-6502	saa@nrc.gov
Jerry Wilson	NRLPO	301-415-3145	jnw@nrc.gov
Rich McIntyre	NRR/DIPM	301-415-3215	RPM1@nrc.gov